DOCUMENT RESUME

ED 070 948 AC 014 115

AUTHOR	Best, K. E.; Blackburn, D. J.
TITLE	Farmer's Use of the Soil Test Report.
INSTITUTION	Guelph Univ. (Ontario). Ontario Agricultural Coll.
SPONS AGENCY	Ontario Ministry of Agriculture and Food, Toronto.
PUB DATE	Dec 72
NOTE	24p.; Publication EE/72/2
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	*Adult Farmer Education; Agricultural Education; Data Analysis; *Educational Background; *Farmers; Interviews; *Participant Characteristics; Questionnaires; Research; *Rural Extension; Soil Science; Statistical Data; Tables (Data)
IDENTIFIERS	Canada; *Ontario

ABSTRACT

A study of Haldimand County (Ontario, Canada) farmers' use and understanding of soil test reports and the relationship of these variables with certain personal and social characteristics of the respondents are summarized. The objectives of the study were to indicate the extent to which farmers use the soil test report, the quality of fertilizer treatment changes made compared to those suggested, and farmers' understanding of information contained in the report. Data were collected by personal interview of the 95 Haldiman County farmers who had received a soil test report during the year ending June 30, 1971. The data obtained were computer processed. A summary of the findings shows that the farmers with the least understanding of the soil test report's fertilizer requirement section included a higher proportion of those with the least education, the smallest farms, the smallest farm income, and did not attend agricultural meetings or activities organized by the county extension workers. It is concluded that the provision for improvement in the quality of soil test information such as that reaching farmers through the fertilizer trade, key farmers, and other personal information sources, could provide a challenge to extension workers. Appendix tables provide the statistical data. (DB)

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ED 070948

FARMERS' USE OF THE SOIL TEST REPORT

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AC014118

December 1972

Publication EE/72/2

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ACKNOWLEDGEMENTS

The research on which this publication is based was conducted in part under the contract for research in Agricultural Resource Planning between the University of Guelph and the Ontario Ministry of Agriculture and Food.

All of the contributions of the many people involved in this study are gratefully acknowledged. The suggestions and cooperation of Professor T. H. Lane, Department of Land Resource Science, were particularly appreciated. The authors, however, accept full responsibility for the data and their interpretation as herein reported. Any errors or omissions are the complete responsibility of the authors.

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FARMERS' USE OF THE SOIL TEST REPORT

K. E. Best* and D. J. Blackburn+

I INTRODUCTION

This report is a summary of a study of Haldimand County farmers' use and understanding of soil test reports and the relationship of these variables with certain personal and social characteristics of the respondents.

II PURPOSES OF THE RESEARCH

Purchased fertilizer is a major crop production cost. Research has shown that application of commercial fertilizer according to soil test is more profitable than following even the best general recommendation. However, little is known about farmers' use and understanding of the soil test report in Ontario. Accordingly, this study of Haldimand County farmers' use and understanding of the soil test report was undertaken to provide such information. The study will also serve as a partial evaluation of the service provided by the Ontario Ministry of Agriculture and Food in cooperation with the University of Guelph.

The objectives of the study were to indicate the extent to which farmers use the soil test report, the quality of fertilizer treatment changes made compared to those suggested, and farmers' understanding of information contained in the report. These data, when analysed relative to personal and social characteristics of respondents, would help in the development of extension programs regarding soil testing and fertilizer use.

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* Agricultural Representative, Ontario Ministry of Agriculture and Food.

+ Professor of Extension Education, University of Guelph.

III METHODOLOGY

Data for the study were collected by personal interview in the fall of 1971. All of the 95 Haldimand County farmers were interviewed who, during the year ending June 30, 1971, received a soil test report as prepared by the Soil Testing Laboratory with interpretation completed by County Extension staff. The number of soil test users in the county was smaller than in previous years, presumably because of the very wet fall of 1970.

Pre-testing of the questionnaire was done with the assistance of Wentworth County soil test users that were suggested by their agricultural representative.

During the Haldimand interviews, carbon copies of the respondents' soil test reports were used for reference, particularly to assist respondents in the recall of fertilizer treatment used. This yielded data on the treatment suggested by the extension worker on the soil test report compared with that actually applied to each field sampled.

To determine respondents' understanding of the soil test report, a sample report that might be common for Haldimand County was prepared. Each respondent was questioned about his understanding of the fertilizer requirement section of the sample report.

Data were processed using the facilities of the Institute of Computer Science, University of Guelph. A chi-square test was used where appropriate to determine the relationship between variables.

IV SUMMARY OF FINDINGS AND CONCLUSIONS

Quality of Fertilizer Treatment Changes

A change in fertilizer treatment from that suggested on the soil test report might be made for many

reasons: a change in crop or manure application plans, availability of the suggested analysis, and ability to apply the suggested treatment with the equipment available. Ninety percent of the respondents did make a change in the fertilizer treatment applied from that suggested on the soil test report.

The fertilizer treatment changes in rate and/or analysis were rated as well-advised or ill-advised from an economic and crop requirement viewpoint.[1] For analytical treatment the respondents were categorized according to whether most (more than one-half) of the changes were well-advised, whether most of the changes were ill-advised, or whether the well-advised and ill-advised changes were about equal.

When those with no changes were included, 44 percent of the respondents were classified in the most changes well-advised category. There were 28 percent in each of the other categories. Thus, 56 percent of the respondents made one-half or more changes that were ill-advised.

Treatment Changes and Respondents' Personal and Social Characteristics[2]

(a) Number of Years' Experience with Soil Testing -- It was found that with increasing levels of soil testing experience, the quality of treatment changes improved (relationship significant at the .01 level). It could be concluded that generally those in need of assistance have

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[1] These ratings were made by one of the researchers who is an Agricultural Representative with the Ministry of Agriculture and Food in Haldimand County. His decision was based on a comparison of actual treatments used by the farmers, compared to those recommended on the soil test report, and a consideration of other relevant factors (such as application of soil amendments like manure).

[2] Data are included in Appendix Table 1.

been soil testing for a relatively short period of time. Seventy-four percent of those testing 21 years or more were in the "most changes well-advised" category compared with only 35 percent of the respondents who had five years or less soil testing experience. Forty-eight percent of the latter group were in the category where more than one-half of their fertilizer treatment changes were ill-advised.

(b) Attendance at Agricultural Meetings -- Also statistically significant at the .01 level was the relationship between quality of fertilizer treatment changes and attendance during the previous year at one or more of the meetings or activities organized by the county Extension staff. Sixty-two percent of the meeting attenders were in the most changes well-advised category in contrast to only 36 percent of the non-attenders.

(c) Other Characteristics -- While not statistically significant, there was a tendency for improvement in quality of fertilizer treatment changes with increasing age, years of experience with fertilizer and with farming, frequency of soil testing, higher gross farm product sales and number of acres farmed. As might be expected, there was also a tendency for those who understood the fertilizer requirements on the soil test report to make better quality changes.

Understanding of Fertilizer Requirements

A section of the soil test report shows the fertility required for a crop after adjustment for fertility available from the soil as determined in the soil test. The requirement is also adjusted for soil amendments, such as manure, which may have been or is to be applied. This serves as the basis for calculating the analysis and rate of fertilizer to be applied.

Understanding of the fertilizer requirement section of the report is important to the farmer particularly if he wishes to calculate his fertilizer needs or is likely to make changes in the suggested fertilizer

treatments. It was found that 90 percent of the respondents did make changes and 56 percent made one-half or more changes that were considered as ill-advised.

Results of the survey showed that 32 percent of the respondents understood the fertilizer requirement section of the soil test report very well. Nineteen percent of them understood the fertilizer requirements to some extent but 49 percent did not understand this part of the soil test report at all.[1]

Personal and Social Characteristics Related to Understanding of Fertilizer Requirements[2]

(a) Formal Education -- The relationship between formal education and understanding of fertilizer requirements was statistically significant at the .01 level. The percentage of respondents who understood well increased with increasing levels of education (from 24 percent of those with Grade 8 or less to 71 percent of those with Grade 13 or more). The group that had some vocational agriculture training rated rather poorly in understanding of fertilizer requirements. Part of this lack of understanding may be associated with language difficulty, since most of this group was made up of immigrants from Holland.

(b) Number of Acres Farmed -- Understanding of the fertilizer requirements on the soil test report was found to be directly related to the number of acres farmed (significant at the .025 level). Almost one-half of the respondents with farms of over 200 acres compared to only 15 percent of those with the smallest farms, understood fertilizer requirements well. Nearly three-quarters of those with the smallest farms did not understand the fertilizer requirement section of the soil test report at all. Operators of larger farms would have more at stake, and hence may be more highly motivated

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1 As judged by one of the researchers who is an Agricultural Representative in Haldimand County.

2 See Appendix Table 2.

to learn about soil testing.

(c) Gross Value of Farm Product Sold -- A significant relationship was found ($p = .005$) between gross value of farm products sold and understanding of the fertilizer requirements. Eighty-one percent of the non-commercial farmers (annual sales less than $2500) did not understand the fertilizer requirements at all. Fifty-three percent of the farmers with sales of $30,000 or more understood fertilizer requirements well.

(d) Attendance at Agricultural Meetings or Activities -- More than one-half (55 percent) of those who attended agricultural meetings organized by the Extension Branch staff during the previous year, understood fertilizer requirements quite well, while a further 24 percent understood to some extent. Sixty-two percent of those who did not attend did not understand at all. This relationship was significant at the .001 level.

One of the extension worker's problems is to involve more people in educational programs. Unfortunately, a low percentage of farmers tend to participate as shown by various studies. In this study, 31 percent of the respondents had taken part in one or more of the educational activities organized by extension workers during the previous year.

(e) Other -- In summary, it was seen that those with the least understanding of the soil test report's fertilizer requirement section included a higher proportion of those with the least education, the smallest farms, the smallest farm income, and those who did not attend agricultural meetings or activities organized by the county extension workers. Although not statistically significant, there was a tendency for a larger proportion of respondents with the least soil test experience, with full time off-farm employment, and those sampled annually by the fertilizer dealer, to have a need for help with understanding fertilizer requirements. Younger farmers tended to understand better than their older counterparts.

Soil Test Users and Census Farmers Compared[1]

Haldimand soil test users tended, on the average, to farm a larger acreage, were a bit younger, were likely to have a larger farm income, and were more likely to farm rented land in addition to that which they owned, compared to the average Haldimand County farm as shown in 1966 Census data. There was very little difference between the two groups in the amount of off-farm work reported.

Usefulness of Help with Understanding Soil Test Reports[2]

Thirty-two percent of the respondents felt that help with understanding the soil test report would be desirable. The same proportion felt that help would be of some value. The remaining 36 percent said that help with understanding the soil test report was not needed.

Statistically significant relationships were found between this variable and formal education ($p = .05$) as well as the number of years' experience with soil testing ($p = .025$). More than one-half of the respondents with the least education said that help with understanding the soil test report would be desirable.

The need for help expressed by respondents with little soil test experience was expected. Since it was found that understanding of the soil test report was related to education, and a smaller percentage of those with the least education understood the soil test report, it is unfortunate that a larger proportion of respondents in this category indicated that help was not needed.

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[1] See K. E. Best "Haldimand Farmers' Use of the Soil Test Report" Unpublished M.Sc. thesis, University of Guelph, Guelph, Ontario, 1972, pp. 26-29.

[2] For data, see Appendix Table 3.

Respondents' Soil Test Information Sources

(a) Most Helpful Source[1] -- Respondents were asked if they discussed the soil test report with anyone before finalizing their fertilizer application plans. They were next asked to identify the source that was most helpful. Forty percent of the respondents did not seek advice on the soil test report. Of the remainder, 16 percent in each case felt that the fertilizer dealer and an O.M.A.F. source were most helpful. Twenty-eight percent of the respondents named a personal source such as a friend, family member or neighbour, reading books or magazines, or rated their own experience as the most helpful source of information.

A statistically significant relationship was found between the source considered most helpful and type of farm enterprise ($p = .025$), gross value of farm product sold ($p = .005$), and attendance at an agricultural meeting ($p = .001$). Dairymen in this study were more likely than any other farmers to consider an O.M.A.F. source as most helpful. Cash crop and livestock combination farmers were least likely to consult any source for help.

Generally, personal sources of information were less frequently named most helpful with increasing levels of farm product sales. The fertilizer dealer was more frequently named most helpful by a large proportion of the middle-income group, and O.M.A.F. as the most helpful source by a larger proportion of the two higher income groups.

A larger proportion of meeting attenders mentioned O.M.A.F. or fertilizer dealers as the most helpful source of information about the soil test. Non-attenders were more likely to contact a personal source or not to seek information at all.

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[1] For data, see Appendix Table 4.

(b) First Source of Information about Soil Testing[1] -- Almost one third of the respondents indicated that they first learned about soil testing through programs of the Ontario Ministry of Agriculture and Food. Almost one-quarter of the respondents first learned about soil testing from a fertilizer dealer. Fifteen percent first learned about the subject at one of the agricultural schools and colleges or at high school. The remaining 29 percent learned about soil testing first from a personal source (including neighbours, friends and family, as well as from reading about soil testing in farm papers).

A statistically significant relationship was found between the respondents' first soil test information source and formal education ($p = .01$), number of acres farmed ($p = .005$), gross value of farm product sales ($p = .05$), and frequency of sampling by the fertilizer dealer ($p = .005$).

A larger proportion of respondents with the least education, smaller farms, lower income, and those who had never had a soil sample taken by a dealer were more likely than others to name a personal source from whom they first learned about soil testing. An O.M.A.F. source was more commonly named by those with larger farms and farm income. Fertilizer dealers were more likely to be the original information source for respondents with middle-sized farms and farm income and by those for whom a soil sample was frequently taken. One-half of the respondents with formal education of Grade 13 or more indicated that they had first learned about soil testing at school.

V IMPLICATIONS AND RECOMMENDATIONS

(1) Twenty-four percent of the respondents worked full-time off the farm. O.M.A.F. and dealer sources of information do not tend to be used to a great extent by these farmers. A brief, concise fact sheet mailed with the soil test report might be of value in helping these

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[1] For data see Appendix Table 5.

farmers with their understanding of the fertilizer requirement part of the soil test report. In addition, nearly one-half of all respondents (49 percent) did not understand the fertilizer requirement section of the soil test report at all. The fact sheet referred to above would likely be of some assistance to all soil test users. This fact sheet should explain the fertilizer requirement portion of the soil test report.

(2) In view of the widespread lack of understanding of the fertilizer requirement section, it would be well to investigate the extent to which the format of the soil test report is a contributory factor.

(3) Ninety percent of the respondents made some change in fertilizer treatment from that suggested on the soil test report. Fifty-six percent of the respondents made one-half or more fertilizer treatment changes that would be categorized as ill-advised. A prepared outline of fertilizer alternatives applicable to the county or area might be of some assistance to those making decisions on changes in fertilizer treatment. The outline could be forwarded from the county extension office with the soil test report or separately just prior to the spring or fall planting season.

(4) The interpretation and suggested treatments prepared by the Extension Branch, O.M.A.F., are important to the majority of farmers. It was shown that 60 percent of the respondents still discussed the report with someone to get their advice. If any change in service is made, it should be toward encouraging more farmers to consult with the Extension Branch staff about the proposed changes in fertilizer treatment. Further, local fertilizer dealers could be encouraged to provide some assistance in this regard. The afore-mentioned fact sheet, fertilizer alternatives outline, and other assistance such as could be provided at a county dealers' meeting, probably should be provided as well to dealers by county agricultural extension staff.

(5) Agricultural schools and colleges along with high schools were the original source of information about soil testing for only 15 percent of the respondents. High schools could be a more important source of information on soil testing, even if the information provided in the curriculum were only incidental in courses such as biology or chemistry. The possibility of such inclusion of the subject in courses should be investigated, especially in instances where the secondary school serves an extensive rural area.

(6) Seventeen percent of the respondents had a soil sample tested for the first time. It was also found that 73 percent of the respondents who had soil tested for only one to five years did not understand the fertilizer requirements at all. Thus the need for help in understanding the soil test report is greatest among those in the early stages of use of the soil test program. The possibility of identification of farmers who have not previously soil tested should be investigated. The computer print-out could possibly provide a coded signal to the extension worker identifying the farmer as a first-time soil tester. Appropriate additional information could be arranged by the extension worker either in a mail-out form and/or at a meeting for first-time soil test users.

(7) A sizeable portion of the farmers who have soil samples taken by the fertilizer dealer are different from other farmers (in that they are more likely to make ill-advised fertilizer treatment changes, are less likely to understand the fertilizer requirements, and have less contact with the Extension Branch). The whole population of farmers contains many more and probably a greater proportion of farmers who would possess these characteristics. If more of these farmers are to become soil test users, the fertilizer dealer or a similar agency would be the primary source of information and assistance in many cases. Serious consideration to greater involvement of the fertilizer trade in training programs is suggested in spite of the added cost the service may entail.

Extension Branch staff of the Ontario Ministry of Agriculture and Food could perform a useful function in implementing this recommendation by providing information at a meeting, or in printed form, about the soil test for those of the fertilizer trade directly serving farmers. It is proposed that meetings or methods of communicating information be arranged by county extension staff for fertilizer trade representatives of the county.

(8) Re-enforcement for those farmers categorized as early adopters could be important in a practice like soil testing where a low rate of adoption exists. Field trials or demonstrations of fertilizers of the proper analysis applied at the proper rate, compared with other rates and analyses, could be useful in the continuation and modification of practices by those who have adopted. Selection of appropriate key farmers as co-operators could be important. The involvement of influential or the key farmers (particularly if they are composed of the friends, neighbours, and family members who serve as the personal information sources for other farmers in the community), would tend to help improve the information that these personal sources provide. It was noted that 28 percent of the respondents in this study found such personal source of soil test information to be the most helpful. This is likely to be even more important among other farmers in the county who have not as yet adopted the practice of soil testing.

(9) The farm press could and may be more important in extending soil test information than was found in this study. It is possible that the research methodology, or the period of time since respondents were at the awareness stage in the adoption process, precluded responses indicating that the media were original information sources. In any case, farm press use of success-type stories and other articles on demonstrations is likely to assist in greater adoption of soil testing as well as provision of further re-enforcement for those who have adopted the practice. Farms managed well by respected operators should be the subject farms for the "success stories".

(10) Attenders at agricultural meetings or extension activities were, as a group, better informed about soil testing than non-attenders. Thirty-one percent of the respondents in this study had attended at least one of such meetings during the previous year. Other studies have shown that 25 to 30 percent of farmers annually attend one or more agricultural meetings or extension activities.

Meetings will continue to be important for extension of agricultural information, but will not likely reach all farmers directly. For extension workers to try to reach all farmers directly through meetings would not be realistic. The provision for improvement in the quality of soil test information such as that reaching farmers through the fertilizer trade, key farmers, and other personal information sources, could provide a more realistic challenge to extension workers.

APPENDIX TABLES

TABLE 1

PERCENTAGE OF HALDIMAND STUDY FARMERS WITHIN VARIOUS DEMOGRAPHIC CATEGORIES BY QUALITY OF FERTILIZER TREATMENT CHANGES

Demographic Categories	Quality of Fertilizer Treatment Changes			Total		
	Most Changes Well-advised	Well & Ill-advised Changes Equal	Most Changes Ill-advised	%	No.	
Years Soil Tested: 1 - 5 years	35%	17	48	100%	29	$X^2 = 17.36$
6 - 10 years	32%	46	22	100%	28	
11 - 20 years	52%	30	18	100%	23	P = .01
21 years or more	74%	13	13	100%	15	
Attendance at Agricultural Meeting(s):						
Attended	62%	31	7	100%	29	$X^2 = 9.5$
Did not attend	36%	28	36	100%	66	P = .01
Age Group: 39 years or younger	38%	35	27	100%	26	$X^2 = 6.47$
40 - 49 years	33%	27	40	100%	33	
50 years or older	58%	25	17	100%	36	P = N.S.
Years Fertilizer Used: 1 - 10 years	37%	26	37	100%	30	$X^2 = 7.15$
11 - 20 years	33%	29	38	100%	24	
21 - 30 years	54%	33	13	100%	24	P = N.S.
31 or more years	59%	24	17	100%	17	
Years in Farming: 1 - 10 years	38%	24	38	100%	24	$X^2 = 6.72$
11 - 20 years	32%	26	42	100%	19	
21 - 30 years	50%	29	21	100%	28	P = N.S.
31 or more years	54%	33	13	100%	24	
Frequency of Soil Testing: This was first	38%	24	38	100%	16	$X^2 = 10.01$
Less than every year	54%	29	17	100%	24	
Some every year	26%	39	35	100%	31	P = N.S.
All or Most Every year	63%	17	20	100%	24	

Value of Product Sold:	Less than $2499	38%	24	38	100% 16	$X^2 = 4.74$
	$2500 - $8999	40%	30	30	100% 20	
	$9000 - $14999	53%	16	31	100% 19	P = N.S.
	$15000 - $29999	38%	38	24	100% 21	
	$30000 or more	53%	31	16	100% 19	
Respondents' Understanding of Soil Test Report:						
	Understands well	53%	37	10	100% 30	$X^2 = 9.06$
	Understands some	44%	34	22	100% 18	
	Does not understand	38%	21	41	100% 47	P = N.S.
Frequency of Sampling by Dealer:						
	Every year	30%	33	37	100% 30	$X^2 = 3.77$
	Less than every year	50%	27	23	100% 30	
	Never	51%	26	23	100% 35	P = N.S.
Usefulness of Help:	Desirable	37%	23	40	100% 30	$X^2 = 4.93$
	Of some use	40%	33	27	100% 30	
	Not needed	54%	29	17	100% 35	P = N.S.
Education:	Grade 8 or less	43%	39	18	100% 33	$X^2 = 5.31$
	Grade 9 - 12	43%	27	30	100% 30	
	Grade 13 or more	57%	14	29	100% 14	P = N.S.
	Vocational Agriculture	39%	22	39	100% 18	
Place of Birth:	Haldimand County	46%	28	26	100% 54	$X^2 = 7.43$
	Other County; Canada	39%	33	28	100% 18	
	Holland	34%	33	33	100% 15	P = N.S.
	Other Country	63%	12	25	100% 8	
Number of Acres:	1 - 100 acres	52%	18	30	100% 27	$X^2 = 3.44$
	101 - 200 acres	46%	26	28	100% 35	
	More than 200 acres	36%	40	24	100% 33	P = N.S.

TABLE 2

PERCENTAGE OF HALDIMAND STUDY FARMERS WITHIN VARIOUS DEMOGRAPHIC CATEGORIES BY UNDERSTANDING OF FERTILIZER REQUIREMENTS

Demographic Categories		Understanding of Fertilizer Requirements			Total		
		Understands Well	Understands Some	Does Not Understand	%	No.	
Formal Education:	Grade 8 or less	24%	15	61	100%	33	$X^2 = 17.62$
	Grade 9 - 12	33%	23	44	100%	30	
	Vocational Agriculture	11%	33	56	100%	18	P = .01
	Grade 13 or more	71%	0	29	100%	14	
Number of Acres Farmed:	1 - 100 acres	15%	11	74	100%	27	$X^2 = 12.5$
	101 - 200 acres	29%	23	48	100%	35	
	201 acres or more	49%	21	30	100%	33	P = .025
Value of Product Sold:	$0 - $2499	0%	19	81	100%	16	$X^2 = 22.65$
	$2500 - $8999	35%	10	55	100%	20	
	$9000 - $14999	37%	16	47	100%	19	P = .005
	$15000 - $29999	29%	42	29	100%	21	
	$30,000 or more	53%	5	42	100%	19	
Attendance at Agriculture Meeting(s):							
	Attended	55%	24	21	100%	29	$X^2 = 14.94$
	Did not attend	21%	17	62	100%	66	P = .001
Years Soil Tested:	1 - 5 years	17%	10	73	100%	29	$X^2 = 9.64$
	6 - 10 years	32%	25	43	100%	28	
	11 - 20 years	43%	22	35	100%	23	P = N.S.
	21 or more years	40%	20	40	100%	15	

Amount of Employment Off-farm:						
None	38%	22	40	100%	53	$X^2 = 5.69$
1 - 179 days	32%	10	58	100%	19	
Regular or full-time	17%	17	66	100%	23	P = N.S.
Frequency of Sampling by Dealer:						
Every year	20%	27	53	100%	30	$X^2 = 4.44$
Less than every year	43%	14	43	100%	30	
Never	32%	17	51	100%	35	P = N.S.
Age Group: 39 years or under	38%	16	46	100%	26	$X^2 = 2.64$
40 - 49 years	33%	24	43	100%	33	
50 years or over	25%	17	58	100%	36	P = N.S.
Years Fertilizer Used: 1 - 10 years	27%	17	56	100%	30	$X^2 = 5.04$
11 - 20 years	25%	25	50	100%	24	
21 - 30 years	46%	21	33	100%	24	P = N.S.
31 years or more	29%	12	59	100%	17	
Place of Birth: Haldimand	33%	19	48	100%	54	$X^2 = 1.31$
Other county: Canada	33%	17	50	100%	18	
Holland	27%	27	46	100%	15	P = N.S.
Other Country	25%	13	62	100%	8	
Type of Farm Enterprise:						
Grain or Cash Crop	32%	18	50	100%	28	$X^2 = 3.75$
Dairy	25%	21	54	100%	24	
Other Livestock Specialty	22%	28	50	100%	18	P = N.S.
Livestock Combination	44%	12	44	100%	25	
Years in Farming: 1 - 10 years	33%	17	50	100%	24	$X^2 = 4.16$
11 - 20 years	26%	21	53	100%	19	
21 - 30 years	39%	25	36	100%	28	P = N.S.
31 or more years	25%	13	62	100%	24	

TABLE 3

PERCENTAGE OF HALDIMAND STUDY FARMERS WITHIN VARIOUS DEMOGRAPHIC CATEGORIES BY RESPONDENTS' FEELING ABOUT USEFULNESS OF HELP WITH UNDERSTANDING SOIL TEST REPORTS

Demographic Categories		Usefulness of Help			Total		
		Desirable	Some Use	Not Needed	%	No.	
Formal Education:	Grade 8 or less	21%	27	52	100%	33	$X^2 = 13.93$
	Grade 9 - 12	37%	40	23	100%	30	
	Vocational Agriculture	56%	28	16	100%	18	P = 0.05
	Grade 13 or more	14%	29	57	100%	14	
Years Soil Tested:	1 - 5 years	52%	21	27	100%	29	$X^2 = 15.31$
	6 - 10 years	32%	32	36	100%	28	
	11 - 20 years	4%	52	44	100%	23	P = 0.025
	21 years or more	33%	20	47	100%	15	
Age Group:	39 years or under	35%	42	23	100%	26	$X^2 = 5.39$
	40 - 49 years	33%	33	34	100%	33	
	50 years and over	28%	22	50	100%	36	P = N.S.
Place of Birth:	Haldimand	24%	41	35	100%	54	$X^2 = 6.42$
	Other County; Canada	39%	22	39	100%	18	
	Holland	47%	20	33	100%	15	P = N.S.
	Other Country	38%	12	50	100%	8	
Years Fertilizer Used:	1 - 10 years	47%	27	26	100%	30	$X^2 = 6.92$
	11 - 20 years	25%	42	33	100%	24	
	21 - 30 years	29%	25	46	100%	24	P = N.S.
	31 or more years	18%	35	47	100%	17	

Acres Farmed:	1 - 100 acres	37%	30	33	100% 27	$X^2 = 2.52$
	101 - 200 years	37%	29	34	100% 35	
	201 acres or more	21%	36	43	100% 33	P = N.S.
Type of Enterprise:	Cash Crop	29%	21	50	100% 28	$X^2 = 6.55$
	Dairy	38%	42	20	100% 24	
	Other Livestock	39%	33	28	100% 18	P = N.S.
	Livestock Combination	24%	32	44	100% 25	
Years in Farming:	1 - 10 years	46%	29	25	100% 24	$X^2 = 9.48$
	11 - 20 years	37%	37	26	100% 19	
	21 - 30 years	25%	21	54	100% 28	P = N.S.
	31 years or more	21%	42	37	100% 24	
Amount of Employment Off-farm:						
	None	26%	34	40	100% 53	$X^2 = 4.42$
	1 - 179 days	32%	42	26	100% 19	
	Regular or Full-time	44%	17	39	100% 23	P = N.S.
Value of Product Sold:	$0 - $2499	62%	19	19	100% 16	$X^2 = 12.74$
	$2,500 - $8,999	20%	40	40	100% 20	
	$9,000 - $14.999	32%	21	47	100% 19	P = N.S.
	$15,000 - $29,999	33%	29	38	100% 21	
	$30,000 or more	16%	47	37	100% 19	
Attendance at Agricultural Meetings:						
	Attended	28%	41	31	100% 29	$X^2 = 1.64$
	Did not attend	33%	28	39	100% 66	P = N.S.
Frequency of Sampling by Dealer:						
	Every year	23%	30	47	100% 30	$X^2 = 3.74$
	Less than every year	30%	40	30	100% 30	
	Never	40%	26	34	100% 35	P = N.S.

TABLE 4

PERCENTAGE OF HALDIMAND STUDY FARMERS WITHIN VARIOUS DEMOGRAPHIC CATEGORIES BY RESPONDENTS' MOST HELPFUL SOURCE OF INFORMATION

Demographic Categories		Most Helpful Source				Total		
		None	Dealer	O.M.A.F.	Personal	%	No.	
Type of Enterprise:	Cash Crop	43%	25	7	25	100%	28	$X^2 = 20.32$
	Dairy	29%	13	38	20	100%	24	
	Livestock Specialty	28%	6	16	50	100%	18	P = 0.025
	Livestock Combination	56%	16	4	24	100%	25	
Value of Product Sold:	$0 - $2499	25%	12	7	56	100%	16	$X^2 = 29.12$
	$2500 - $8999	60%	15	5	20	100%	20	
	$9000 - $14999	36%	32	0	32	100%	19	P = .005
	$15000 - $29999	24%	14	33	29	100%	21	
	$30000 or more	53%	5	32	10	100%	19	
Attendance at Agricultural Meeting(s):								
	Attended	38%	24	34	4	100%	29	$X^2 = 20.28$
	Did not attend	41%	12	8	39	100%	66	P = .001
Age Group:	39 years or less	27%	15	35	23	100%	26	$X^2 = 11.23$
	40 - 49 years	43%	12	12	33	100%	33	
	50 years or more	47%	19	6	28	100%	36	P = N.S.
Formal Education:	Grade 8 or less	52%	9	9	30	100%	33	$X^2 = 9.99$
	Grades 9 - 12	33%	27	13	27	100%	30	
	Vocational Agriculture	39%	6	22	33	100%	18	P = N.S.
	Grade 13 or more	29%	21	29	21	100%	14	
Place of Birth:	Haldimand	45%	20	11	24	100%	54	$X^2 = 15.74$
	Other County, Canada	28%	6	17	49	100%	18	
	Holland	33%	7	40	20	100%	15	P = N.S.
	Other Country	50%	25	0	25	100%	8	

Years Fertilizer Used:	1 - 10 years	30%	17	23	30	100% 30	X^2 = 8.85
	11 - 20 years	38%	12	12	38	100% 24	
	21 - 30 years	42%	12	12	34	100% 24	P = N.S.
	31 or more years	58%	24	12	6	100% 17	
Years Soil Tested:	1 - 5 years	21%	14	21	44	100% 29	X^2 = 15.14
	6 - 10 years	36%	18	18	28	100% 28	
	11 - 20 years	52%	13	9	26	100% 23	P = N.S.
	21 years or more	67%	20	13	0	100% 15	
Acres Farmed:	1 - 100 acres	48%	15	7	30	100% 27	X^2 = 11.43
	101 - 200 acres	29%	26	11	34	100% 35	
	201 acres or more	46%	6	27	21	100% 33	P = N.S.
Years in Farming:	1 - 10 years	21%	21	21	37	100% 24	X^2 = 6.72
	11 - 20 years	42%	11	21	26	100% 19	
	21 - 30 years	50%	14	14	22	100% 28	P = N.S.
	31 or more years	46%	17	8	29	100% 24	
Amount of Employment Off-farm:							
	None	47%	17	19	17	100% 53	X^2 = 9.85
	1 - 179 days	26%	21	16	38	100% 19	
	Regular (or full-time)	34%	9	9	48	100% 23	P = N.S.
Frequency of Sampling by Dealer:							
	Every year	46%	17	7	30	100% 30	X^2 = 8.69
	Less than every year	33%	27	20	20	100% 30	
	Never	40%	6	20	34	100% 35	P = N.S.

TABLE 5

PERCENTAGE OF HALDIMAND STUDY FARMERS WITHIN VARIOUS DEMOGRAPHIC CATEGORIES BY RESPONDENTS' FIRST SOIL TEST INFORMATION SOURCE

Demographic Categories		First Source of Information				Total		
		O.M.A.F.	Dealer	School	Personal	%	No.	
Formal Education:	Grade 8 or less	27%	27	10	36	100%	33	$X^2 = 23.12$
	Grade 9 - 12	47%	23	3	27	100%	30	
	Vocational Agriculture	17%	33	17	33	100%	18	P = 0.01
	Grade 13 or more	29%	7	50	14	100%	14	
Acres Farmed:	1 - 100 acres	7%	26	15	52	100%	27	$X^2 = 21.33$
	101 - 200 acres	37%	34	6	23	100%	35	
	201 acres or more	46%	12	24	18	100%	33	P = .005
Value of Product Sold:	Less than $2,499	13%	25	0	62	100%	16	$X^2 = 22.7$
	$2500 - $8999	25%	20	20	35	100%	20	
	$9000 - $14999	32%	42	5	21	100%	19	P = 0.05
	$15000 - $29999	38%	14	29	19	100%	21	
	$30,000 or more	47%	21	16	16	100%	19	
Frequency of Dealer Sampling:	Every year	27%	40	10	23	100%	30	$X^2 = 19.22$
	Less than yearly	37%	33	17	13	100%	30	
	Never	31%	3	17	49	100%	35	P = 0.005
Place of Birth:	Haldimand	37%	30	13	20	100%	54	$X^2 = 12.59$
	Other County: Canada	39%	11	11	39	100%	18	
	Holland	13%	27	27	33	100%	15	P = N.S.
	Other Country	12%	12	12	64	100%	8	
Years Using Fertilizer:	1 - 10 years	27%	23	17	33	100%	30	$X^2 = 16.43$
	11 - 20 years	13%	25	21	41	100%	24	
	21 - 30 years	58%	13	13	16	100%	24	P = N.S.
	31 or more years	29%	41	6	24	100%	17	

Years Soil Tested:	1 - 5 years	17%	21	24	38	100%	29	X^2 = 13.76
	6 - 10 years	39%	29	4	28	100%	28	
	11 - 20 years	48%	13	13	26	100%	23	P = N.S.
	21 years or more	20%	40	20	20	100%	15	
Type of Enterprise:	Cash Crop	25%	29	14	32	100%	28	X^2 = 6.55
	Dairy	46%	21	8	25	100%	24	
	Livestock Specialty	22%	17	28	33	100%	18	P = N.S.
	Livestock Combination	32%	28	12	28	100%	25	
Years in Farming:	1 - 10 years	29%	21	17	33	100%	24	X^2 = 11.42
	11 - 20 years	11%	32	21	36	100%	19	
	21 - 30 years	54%	18	10	18	100%	28	P = N.S.
	31 years or more	25%	29	13	33	100%	24	
Attendance at Agricultural Meeting(s):								
	Attended	52%	10	14	24	100%	29	X^2 = 3.15
	Did not attend	23%	30	15	32	100%	66	P = N.S.
Amount of Employment Off-farm:								
	None	32%	28	17	23	100%	53	X^2 = 6.41
	1 - 179 days	42%	10	16	32	100%	19	
	Regular (or full-time)	21%	26	9	44	100%	23	P = N.S.
Age Group:	39 years or less	31%	27	23	19	100%	26	X^2 = 3.42
	40 - 49 years	33%	24	9	34	100%	33	
	50 years or more	31%	22	14	33	100%	36	P = N.S.

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